NWX-DISEASE CONTROL & PREVENTI

Moderator: Dale Babcock
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11:00 am CT

Coordinator: Welcome and thank you for standing by. At this time all participants are in a listen-only mode. During the question and answer session you may press star 1 on your touchtone phone if you would like to ask a question.

Today's conference is being recorded. If you have any objections you may disconnect at this time. I'd now like to turn the meeting over to Skip Wolfe. Sir you may begin.

Skip Wolfe: Thank you. And welcome to Current Issues in Immunizations, a CDC Net Conference. I'm Skip Wolfe from the Training and Education branch of the Immunization Services Division of the National Center for Immunization and Respiratory Diseases at CDC,.and I'll be moderating today.

To participate in today's session you will need a telephone connection and a separate internet connection. The learning objectives for this session are: describe an emerging immunization issue; list a recent immunization recommendation made by the Advisory Committee on Immunization Practices, ACIP; locate resources relevant to current immunization practice;

and obtain, assess, and apply patient information to determine the need for immunization.

It's October 14, 2015. Today Ms. JoEllen Wolicki a Nurse Educator in the Training and Education Branch of CDC's NCIRD will discuss varicella and zoster, as they are presented in the CDC textbook Epidemiology and Prevention of Vaccine-Preventable Diseases, or the Pink Book, the 13th edition of which was published earlier this year. A question and answer session will follow today's presentation.

Please note the following: If you have technical problems please press star 0 on your telephone. And if you will want to ask a question when we get to that segment of the program press star 1 on the phone to ask a question.

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When obtaining CE you will be required to provide a verification code. This verification code will come up during the course. Be watching and listening for it. The verification codes will not be given outside of this presentation.

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CDC does not accept any commercial support. And now I will turn the microphone over to Ms. Wolicki. JoEllen you may begin.

JoEllen Wolicki: Thank you. And good afternoon everyone. Today I will be discussing varicella and zoster disease and vaccines.

Varicella is commonly referred to as chicken pox. Zoster iscalled shingles. Chapter 22 begins on 354 of the 13th edition of the Epidemiology and Prevention of Vaccine Preventable Diseases textbook, also known as the "Pink Book."

Varicella-zoster virus or VZV is a member of the Herpesvirus family. Other members include herpes simplex one and two, cytomegalovirus, and Epstein-Barr virus. Varicella zoster virus shares with these viruses the capacity to persist in the body after the primary infection has resolved and a tendency to recur.The primary, or initial, infection with varicella zoster virus results in varicella or chickenpox. Recurring infection results in herpes zoster or shingles. The virus is fragile.And survives only a short time in the environment.

Varicella-zoster virus enters through the respiratory tract. The virus is believed to replicate at the site of entry in the nasal pharynxand in the regional lymph nodes. A primary varemia occurs four to six days after infection and disseminates the virus to other organs such as the liver, spleen, and sensory ganglia. Further replication occurs in the viscera followed by a secondary varemia, with viral infection of the skin. Virus can be cultured from mononuclear cells of an infected person from five days before to one or two days after the appearance of the rash.

This picture shown on this slide is of a child with a typical chickenpox rash. Some of you may have a similar childhood picture. I know I do. Almost all

primary infections with varicella zoster virus are symptomatic. Self-clinical or asymptomatic primary infections are not common. However, there may be only a few lesions, which may be overlooked by the patient or parent.

A mild prodrome may precede the onset of a rash. Adults may have one to two days of fever and malaise prior to rash onset, but in children the rash is often the first sign of disease. In individuals who have not been vaccinated with varicella vaccine, the rash is generalized and progresses rapidly from macules to papules to vesicular lesions before crusting. The rash usually appears first on the head, then on the trunk, and then on the extremities; the highest concentration of lesions is on the trunk. Lesions also can occur on mucus membranes of the oral pharynx, respiratory track, vagina, conjunctiva, and cornea. Lesions are usually 1 to 4 mm in diameter. The vesicles are superficial and delicate and contain clear fluid. Vesicles may rupture or become purulent before they dry and crust. Success crops over several days with lesions present in several stages of development. For example, macular lesions may be observed in the same area of skin as mature lesions. Healthy children usually have 200 to 500 lesions in 2 to 4 successive crops.

Herpes zoster, or shingles, occurs when latent varicella virus reactivates and causes recurrent disease. The immunologic mechanism that controls latency of varicella-zoster virus is not well understood. However, factors associated with recurrent disease include aging, immunosuppression, intrauterine exposure to varicella-zoster virus and having had varicella younger than 18 months of age. In immune compromised persons, zoster may disseminate, causing generalized skin lesions and central nervous system, pulmonary, and hepatic involvement. The vesicular eruption of zoster generally occurs unilaterally in the distribution of a sensory nerve. Most often, this involves the trunk or the fifth cranial nerve. Two to four days prior to eruption, there may be pain,

numbness, and tingling in the involved area. There are few systemic symptoms.

This slide shows a picture of a typical rash associated with zoster.

Varicella is generally mild and self-limited in healthy children but may result in complications. Secondary bacterial infections of skin lesions are the most common cause of hospitalization and outpatient medical visits.Secondary infection with invasive group A strep may cause serious illness and lead to hospitalization or death. Pneumonia following varicella is usually viral but may be bacterial. Secondary bacterial pneumonia is more common in children younger than one year of age. Central nervous system manifestation of varicella range from aseptic meningitis to encephalitis. Diffuse cerebral involvement is more common in adults then in children. Reye syndrome is an unusual complication of varicella and occurs almost exclusively in children who take aspirin during the acute illness. The etiology of Reye syndrome is unknown. There has been a dramatic decrease in the incidence of Reye syndrome, presumably related to decreased use of aspirin by children. In the pre-vaccine era, approximately 11,000 persons with varicella required hospitalization each year. Death can occur in immunocompetent children and adults. Since 1996, hospitalizations and deaths from varicella have declined more than 70 and 88% respectively.

Here is a picture of a young child with a secondary bacterial infection of chicken pox lesions. This complication can be very severe or fatal, particularly is group A strep is involved.

Some groups are at an increased risk for complications of varicella. For example, healthy adults are 25 times more likely to die from varicella than healthy children. Immunocompromised persons are at high risk of severe

varicella disease. These persons may have prolonged illness and an increased risk of complications. One of the highest risk groups is newborns of mothers with rash onset within five days before through two days after delivery.

Life threatening complications of zoster can occur. These include dissemination with generalized skin eruptions and involvement of the central nervous system, lung, liver, and pancreas. Dissemination, pneumonia, and visceral involvement are, however, usually restricted to immunocompromised persons. A feared consequence of zoster, particularly in older persons, is postherpetic neuralgia or PHN. PHN is the persistence of sometimes debilitating pain, for weeks to many months after the resolution of the rash. Chronic pain from zoster can lead to insomnia, depression, and poor physical and social functioning. There is no consistently effective treatment for PHN. Approximately 15% of zoster cases involve the ophthalmic of the trigeminal nerve and involve the eye. This is called ophthalmic zoster and can lead to reduced vision or blindness.

Here is a picture of a woman with zoster involving the trigeminal nerve and affecting the eye.

Varicella and herpes zoster occur worldwide. Some data suggest that in tropical areas varicella infection occurs more commonly among adults than children. The reason or reasons for this difference in age distribution are not known with certainty. Varicella is a human disease. No animal or insect source or vector is known to exist. Infection with varicella zoster occurs through the respiratory tract. The most common mode of transmission of varicella-zoster virus is believed to be person to person from infected respiratory tract secretions. Transmission may also occur by respiratory contact with airborne droplets or by direct contact or inhalation of aerosols from vesicular fluid of skin lesions of acute varicella or zoster. In temperate

areas, varicella has a distinct seasonal fluctuation with the highest incidence occurring in the winter.

An estimated 500,000 to 1 million episodes of zoster occur annually in the United States. The lifetime risk of zoster is estimated to be at least 32%. Increasing age and cellular immunosuppression are the most important risk factors; 50% of persons living until age 85 will develop zoster.

There are three varicella containing vaccines available in the United States. Single antigen varicella vaccine was licensed in 1995. Combination measles, mumps, rubella varicella, or MMRV, was licensed in 2005. Zoster vaccine was licensed in 2006. On this slide you see the FDA age indications for each vaccine and the ACIP abbreviation for each vaccine.

All three vaccines contain the live Oka/Merck varicella vaccine virus but in different amounts. The concentration of the virus is measured in plaque forming units abbreviated PFU. VARIVAX single antigen varicella vaccine contains about 1400 PFU per dose. ProQuad, or MMRV, contains about 7 times the virus in a dose of VARIVAX. ZOSTAVAX vaccine contains about 14 times the concentration in VARIVAX.

After a single dose of single-antigen varicella vaccine, 97% of children 12 months through 12 years of age develop detectable antibody titers. More than 90% of vaccine responders maintain antibody for at least 6 years. In Japanese studies, 97% of children had antibody 7 to 10 years after vaccination. Vaccine efficacy is estimated to be 70 to 90% against infection and 90 to 100% against moderate to severe disease. Among healthy adolescents and adults 13 years of age and older, an average of 78% develop antibody after one dose, and 99% develop antibody after a second dose given 4 to 8 weeks later. Antibody persisted for at least one year in 97% of vaccinees after the second dose.

Immunity appears to be long lasting, and is probably permanent in the majority of vaccinees. MMRV vaccine was licensed on the basis of equivalence of immunogenicity of the antigenic components rather than clinical efficacy. Clinical studies involving healthy children aged 12 through 23 months indicated that those who received a single dose of MMRV vaccine developed similar levels of antibody to measles, mumps, rubella and varicella as children who received MMR and varicella vaccines simultaneously at separate injection sites.

Breakthrough infection is significantly milder than infection among unvaccinated persons, with fewer lesions generally less than 50. And many of which are maculopapular rather than vesicular. Most persons with breakthrough infection do not have fever. Although findings from studies have suggested otherwise, most investigations have not identified time since vaccination as a risk factor for breakthrough varicella. Classifications of varicella infection as breakthrough could be a result of several factors, including interference of vaccine virus replication by circulating antibodies, impotent vaccine resulting from storage or handling errors, or inaccurate recordkeeping. Interference from live viral vaccine administered before varicella vaccine could also reduce vaccine effectiveness. A study of 115,000 children in two health maintenance organizations during 1995 to 1999, from the children who received the varicella vaccine less than 30 days after MMR vaccination had a 2.5-fold increase risk of breakthrough varicella compared with those who received varicella vaccine before, simultaneously with, or more than 30 days after MMR. Studies have shown that a second dose of varicella vaccine boosts immunity and reduces the risk of breakthrough disease in children.

The primary clinical trial for zoster vaccine included more than 38,000 adults 60 to 80 years of age with no prior history of shingles. Participants were followed for a median of 3.1 years after a single dose of vaccine.

Compared with the placebo group, the vaccine group had 51% fewer episodes of zoster. Efficacy was highest for persons 60 through 69 years of age. And declined with increasing age. Efficacy was 18% for participants 80 years of age and older. Vaccine recipients who developed zoster generally had less severe disease. Vaccine recipients also had about 66% less postherpetic neuralgia or PHN, the pain that can persists long after the shingles rash has resolved. In subsequent clinical trials that included more than 22,000 persons 50 through 59 years of age, zoster vaccine was shown to reduce the risk of zoster by 69.8% in this age group. The duration of reduction for the risk of zoster is not known.

Here is figure 1 of the 2015 childhood immunization schedule. Varicella is highlighted by the red box.

Here is figure 1 of the 2015 adult immunization schedule. Varicella immunization recommendations are again highlighted by the red box. This figure shows the age based recommendations for adults.

This slide shows figure 2 of the adult immunization schedule. These vaccine recommendations are based on medical and other indications. Again varicella recommendations are shown in the red box.

So now let's talk a little bit about vaccine recommendations and we're going to start with children. Varicella vaccine is recommended for all children without contraindications at 12 through 15 months of age. A second dose of varicella vaccine should be administered at 4 through 6 years of age. The

second dose may be administered earlier than 4 to 6 years of age if at least 3 months have elapsed following the first dose. However, if the second dose is inadvertently administered sooner than three months but at least 28 days following the first dose, the dose does not need to be repeated. Two doses of vaccine are also recommended for previously unvaccinated children 7 to 12 years of age without evidence of immunity. A second dose of varicella vaccine is also recommended for persons 6 years of age and older who have received only one dose.

Varicella vaccine should be administered to all adolescents and adults 13 years of age and older who do not have evidence of varicella immunity. Persons 13 years of age and older should receive 2 doses of varicella vaccine separated by at least 4 weeks. If there is a lapse of more than 4 weeks after the first dose, the second dose may administered at any time without repeating the first dose. All varicella containing vaccines should be administered by subcutaneous injection.

In 2011, ACIP published updated comprehensive recommendations for the protection of healthcare personal against vaccine-preventable diseases. Healthcare facilities should develop policies that ensure that all healthcare personal have evidence of immunity to varicella disease. In this statement, ACIP recommends varicella vaccine for all healthcare personal without evidence of immunity. Prevaccination, serologic testing for varicella immunity of certain personnel is probably cost-effective. Screening could be considered for personnel who are uncertain of their varicella history or who report not having had the disease. But postvaccination testing, testing after receiving vaccine, for varicella immunity is not necessary or recommended because 99% of recipients are seropositive after the second dose. In fact, we strongly recommend you not do serologic testing after vaccination. Most commercial antibody tests are not sensitive enough to detect antibody in some

vaccinated persons. So postvaccination testing can make your life more difficult, because the false negative results will make it appear that you have more susceptible persons than you actually have.

If a person meets any of the criteria outlined on this slide, he or she can be considered immune to varicella. The first criterion is a written documentation of age-appropriate vaccination. This would be one dose administered on or after the first birthday for pre-school aged children and two doses for school-aged children, adolescents, and adults. Second, a person born in the U.S. before 1980 can be considered immune, except for healthcare personnel and pregnant woman. A higher standard of presumptive immunity is needed for these two groups. The third criterion is laboratory evidence of immunity or laboratory confirmation of varicella disease. Commercial assays can be used to assess disease-induced immunity. But, as noted earlier, these lack sensitivity to always detect the vaccine-induced immunity, so they may yield false negative results in vaccinated persons. The fourth criterion is a health care provider diagnosis of varicella or verification of history of varicella disease. Verification means that the healthcare provider may retrospectively diagnose chicken pox based on the history provided by a patient or a parent. The last criterion for evidence of immunity is a history of herpes zoster or shingles based on a healthcare provider diagnosis. A person needs to fit only one of these criteria to be considered immune to varicella. Anyone who fits none of these should be presumed to be susceptible and should be vaccinated. Details about these criteria for varicella immunity are in the 2007 Varicella ACIP Statements.

ACIP recommends varicella vaccine for persons without evidence of immunity after exposure to varicella. The vaccine is 70 to 100% effective preventing infection if given within 72 hours and possibly up to 5 days following exposure. Vaccine is not effective if given more than 5 days after

exposure, but still vaccinate anyway. The vaccine will produce immunity in the recipient if the person has not been infected with wild varicella virus.

Here is figure 1 of the adult schedule, the age based recommendation chart. Zoster vaccine recommendations are shown in the red box.

Here is figure 2. Again the vaccination recommendations for adults based on medial and other indications, zoster is highlighted with the red box.

ACIP recommends a single dose of zoster vaccine for adults 60 years of age and older. Persons with a history of a prior episode of herpes zoster should be vaccinated. Also persons with chronic medical conditions may be vaccinated unless a contraindication or a precaution exists for the condition.

As noted on a previous slide, zoster vaccine is FDA approved for persons 50 years of age and older. However, ACIP does not currently recommend routine vaccination of persons younger than 60 years of age because of concerns about vaccine supplies and the lower risk of zoster in this age group.

ACIP recommends zoster vaccines for persons who are unsure or do not remember having chickenpox disease. These people have varicella immunity based on the ACIP definition of immunity born before 1980 in the United States. It is not necessary to establish immunity prior to vaccination so do not screen potential zoster vaccine recipients for either a history of chickenpox or do serologic testing for varicella immunity.

Although most persons 60 years of age and older will test positive, since they had chickenpox, some will test negative. A negative screening test is more likely to indicate waning antibody level below the detection limit of the test rather than true susceptibility. Persons who are tested and found to be

seronegative should receive two doses of single antigen varicella vaccine not zoster vaccine. Zoster vaccine is currently not indicated for persons whose immunity is based on vaccination.

In June 2011, the package insert for zoster vaccine was revised to advice health care personal that in a randomized clinical study, a reduced immune response to ZOSTAVAX was observed in individuals who received Pneumovax 23 or PPSV23 and ZOSTAVAX at the same clinical visit compared with individuals who receive these vaccines four weeks apart. Subsequent clinical studies did not find a significant increase in the incident of zoster among persons who received zoster vaccine and PPSV23 at the same visit compared with persons who received the vaccines 30 or more days apart.

Consequently, to avoid introducing barriers to patient and providers who are interested in providing protection to these diseases, CDC has not changed its recommendations for either vaccine, and continues to recommend that zoster vaccine and PPSV23 be administered at the same visit if the person is eligible for both vaccines. Zoster vaccine can also be administered with other vaccines, especially considering the time of year that we're in, it can be administered at the same time as flu vaccine.

Contraindications to varicella containing vaccines are very similar to those of other live virus vaccines. Persons with severe allergic reactions, such as anaphylaxis, to a vaccine component or following a prior dose of varicella containing vaccine should not receive varicella vaccine. Varicella, MMRV, and zoster vaccines all contain minute amounts of neomycin and hydrolyzed gelatin but do not contain egg protein or preservative. Pregnancy is a contraindication to vaccination. Woman known to be pregnant or attempting to become pregnant should not receive a varicella-containing vaccine, including zoster. No adverse outcomes of pregnancy or in a fetus have been

reported among women who were inadvertently received varicella vaccines shortly before or during pregnancy. Although the manufacturer's package inserts states otherwise ACIP recommends that pregnancy be avoided for one month following the receipt of varicella vaccine. This is an off label ACIP recommendation. The manufacturer in collaboration with CDC has established a varicella vaccination in pregnancy registry to monitor the maternal fetal outcomes of pregnant women inadvertently given varicella containing vaccines. Persons with immunosuppression due to leukemia, lymphoma, generalized malignancy, immune deficiency disease, or immunosuppressive therapy should not be vaccinated with varicella-containing vaccine. However treatment with low dose, less than 2 mg/kg/day , alternate-day topical, replacement, or aerosolized steroid preparations is not a contraindication to vaccinations. Persons whose immunosuppressive therapy with steroids has been discontinued for one month, three months for chemotherapy, may be vaccinated.

Most immunocompromised persons should not be vaccinated. But available data indicate that varicella vaccine is both effective and safe in persons with impaired humoral immunity. This includes hypogamma-globulinemia and other selective Bcell immune deficiencies. Humeral immuno deficiency alone is not considered to be a contraindication to varicella vaccine. ACIP now recommends that you routinely vaccinate persons with isolated humeral immunodeficiency. Remember that the antibody products used to treat an isolated humeral immunodeficiency may interfere with the response to the vaccine. Recommended spacing between the administration of blood products and the receipt of varicella vaccine should be observed. Persons with moderate or server cellular immunodeficiency resulting from infection with human immunodeficiency virus or HIV, including persons diagnosed with acquired immunodeficiency syndrome should not receive varicella vaccine.

HIV infected children with CD4 T-lymphocyte percentage of 15% or higher and older children and adults with a CD4 count of 200 per microliter or higher may be considered for vaccination. These persons may receive MMR and single antigen varicella vaccines but should not receive MMRV vaccine or ProQuad.

As with other vaccines, moderate or severe acute illness is a precaution. Vaccination should be deffered until the acute illness has improved. This precaution is intended to prevent complicating the management of an ill patient with a potential vaccine adverse event, such as a fever. Minor illness, such as otitis media and upper respiratory infections, concurrent antibiotic therapy, and exposure or recovery from other illnesses are not contraindications to varicella vaccine. Althere is no evidence that either varicella or varicella vaccine exacerbates tuberculosis, vaccination is not recommended for persons known to have untreated active tuberculosis. Tuberculosis skin testing is not a prerequisite for a varicella vaccination. The effect of the administration of antibody-containing blood products such as immune globulin, whole blood, packed red cells, or intravenous immune globulin, on the response to varicella vaccine virus is unknown. Because of the potential inhibition of the response to varicella vaccination by passively transferred antibodies, varicella or MMRV vaccine should not be administered for 3 to 11 months after the receipt of antibody-containing blood products. Recent blood products could interfere with the viral replication.The recommendation is to administer the vaccine at least two weeks prior to receiving blood products..

A personal or family history of seizures of any etiology is a precaution for MMRV vaccination. Studies suggest that children who have a personal or family history of febrile seizures or family history of epilepsy are at increased risk for febrile seizures compared with children without such history. Children

with a personal or family history of seizures of any etiology generally should be vaccinated with separate MMR and varicella vaccines because the risks of using MMRV vaccine in this group of children generally outweigh the benefits.

As with all vaccines a severe allergic reaction to a vaccine component or following a prior dose, is a contraindication to zoster vaccination. As with other live attenuated virus vaccines, pregnancy or planned pregnancy within four weeks that ACIP off label recommendation again and immunosuppression are contraindications to zoster vaccinations. We receive many questions about immunosuppression and zoster vaccines. So we're going to take a few minutes to talk about those.

Zoster vaccine should not administered to persons with primary or acquired immunodeficiency. This includes persons with leukemia, lymphomas, or other malignant neoplasm, affecting the bone marrow or the lymphatic system. The product information implies that zoster vaccines should not be administered to anyone who has ever had leukemia, or lymphoma. However, ACIP recommends that persons whose leukemia or lymphoma is in remission and who have not received chemotherapy or radiation for at least three months may be vaccinated.

Other immunosuppressive conditions that contraindicate zoster vaccine include AIDS or other clinical manifestations of HIV including CD4 T_ lymphocyte values less than 200 per mm^3 or less than 15% of total lymphocytes.

Persons receiving high dose corticosteroid therapy should not be vaccinated. High dose is defined as 20 milligrams or more per day of prednisone or equivalent lasting two or more weeks. Zoster vaccination should be deferred

for at least one month after the discontinuation of this therapy. As with other live viral vaccines, persons receiving lower doses of corticosteroids maybe vaccinated. Topical, inhaled, or long term alternate-day treatment with low or moderate doses of short-acting systemic corticosteroids are not considered to be sufficiently immunosuppressive to contraindicate zoster vaccines. Low doses of drugs used for the treatment of rheumatoid arthritis, inflammatory bowel disease, and other conditions such as methotrexphate are also not considered sufficiently immunosuppressive to create safety concerns for zoster vaccine. Low dose therapy with these drugs is not a contraindication to the administration of zoster vaccine.

The experience of Hematopoietic Stem Cells transplant recipient with varicella containing vaccines, including zoster vaccine is limited. Physicians should assess the immune status of the recipient on a case by case basis to determine the relevant risks. If a decision is made to vaccinate with zoster vaccine, the vaccine should be administered at least 24 months after transplantation.

The safety and efficacy of zoster vaccine administered concurrently with recombinant human immune mediators and immune modulators, such as anti-tumor necrosis factor agents is not known. It is preferable to administer zoster vaccine before initiation of treatment with these drugs. If it is not possible to administer zoster vaccine to patients before the initiation of treatment, physicians should assess the immune status of the recipient on a case by case basis to determine the relevant risk and benefits. Otherwise vaccination with zoster vaccine should be deferred for at least one month after the discontinuation of treatment.

As with other vaccines, moderate or severe acute illness is a precaution to vaccination with zoster vaccine. Current treatment with an antiviral drug

active against herpesviruses such as acyclovir is a precaution to vaccination. These drugs can interfere with a replication of the vaccine virus needed to produce the immunity. Persons taking these drugs should discontinue them for at least 24 hours before the administration of zoster vaccine, and the drugs should not be taken for at least 14 days after vaccination. Unlike most other live attenuated virus vaccines, recent receipt of a blood product is not a precaution for zoster vaccine. Zoster vaccine can be administered anytime before, concurrent with, or after receiving blood or other antibody-containing blood products. Persons with a history of varicella are immune and generally maintain a high level of antibody to varicella zoster virus- a level comparable to that found in donated blood and antibody containing products. Receiving an antibody containing blood product will not change the amount of antibody in a person's blood.

Most common adverse reaction is an injection site complaint. Such as pain, swelling, and redness. You might not have expected this from a live attenuated virus vaccine, but injection site complaints are reported in about 20% of recipients. 3 to 4% of recipients will develop a varicella like vesicle at the site of injection. Generalized rash is reported in 4 to 6% of recipients. The rash may be maculopapular rather than vesicular, and have an average of only about 5 lesions. A temperature of 102 degrees Fahrenheit or higher in 42 days following varicella vaccination was reported in 10 to 15% of recipients.

Most cases of zoster after vaccination have been reported in children. This would make sense since most of the vaccine has been given to children. Vaccine virus has been isolated from only a few of these children.

Wild varicella virus has been isolated in some cases, meaning the person was infected with wild-type varicella before or after being vaccinated. Based on current data, the risk of zoster from varicella - vaccine virus appears to be less

than the rest of zoster from wild varicella virus. In addition, zoster after vaccine has been mild and without complications such as the postherpetic neuralgia we spoke of earlier.

In MMRV vaccine prelicensure studies conducted among children 12 to 23 months of age, fever was observed 5 to 12 days after vaccination in 21.5% of MMRV recipients ascompared to 14.9% of MMR vaccine and varicella vaccine recipients administered separately. Two postlicensure studies indicated that among children 12 through 23 months of age, one additional febrile seizure occurred 5 to 12 days after vaccination per 2,300 to 2,600 children who received the first dose of MMRV, compared with children who received the first dose of MMR vaccine and varicella vaccine administered as separate injections at the same visit. Data from postlicensure studies do not suggest that children 4 to 6 years of age who received a second dose of MMRV vaccine had increased risk for febrile seizures after vaccination compared with children the same age who received MMR a varicella vaccines administered at separate injections at the same visit.

For the first dose the measles, mumps, rubella, and varicella vaccines given at 12 to 47 months, either MMR or varicella vaccines or MMRV vaccine can be used. However, providers considering using MMRV vaccine for children in this age group, it is important to take the time to talk with parents or caregivers about both the benefits and the risks of both vaccination options.

Unless the parent or caregiver expresses a preference for MMRV vaccine, CDC recommends that MMR vaccine and varicella vaccine should be administered as separate injections for the first dose in children 12 through 47 months of age.

Available data from postlicensure studies do not suggest that children aged 4 through 6 years who received MMRV vaccines have an increased risk for febrile seizures after vaccinations compared with the same children who received MMR and varicella vaccines at the same visit. In addition, the second dose of MMRV vaccine is less likely to cause fever than the first dose. When the first dose of measles, mumps, rubella, and varicella vaccine is administered at age 48 months or older and for the second dose at any age - 15 months through 12 years use MMRV - MMRV vaccine can be used. The combination vaccine is generally preferred over separate injections of MMR and varicella vaccines. Considerations should include provider assessment- including the number of injections, the vaccine availability, the likelihood of improved coverage, the likelihood of patient returns, storage and costs, patient preference, and the potential for adverse events.

In the largest clinical trial of zoster vaccine local reactions such as redness, pain, and tenderness and swelling were the most common adverse reaction reported by vaccine recipients- 34%, and were reported more commonly than placebo recipients-6%. A temperature of 101 degrees Fahrenheit or higher within 42 days of vaccination occurred at a similar frequency for both vaccine and placebo recipients. No serious adverse events were identified during the trial.

Varicella-containing vaccines should be stored between negative 58 degrees Fahrenheit and 5 degrees Fahrenheit or negative 50 Celsius and negative 15 Celsius, in the original box with the lids on. Vaccines should be protected from light. Store diluents at room temperature in the refrigerator. Do not freeze the diluents. Vaccine may be stored in the refrigerator between 36 and 46 degrees Fahrenheit or 2 to 8 degrees Celsius for up to 72 continuous hours after removal from the freezer. If not used, discard after 72 hours. Reconstitute the lioplyzed vaccine just prior to administration using the

diluents supplied by the manufacturer. Once prepared the clock is ticking and varicella and MMR vaccines must be used within 30 minutes. Zoster vaccines should be reconstituted and used immediately upon removal or used immediately upon reconstitution.

Here are some varicella vaccine resources for immunization provider outlined on this slide.

And here are some zoster vaccine resources for immunization providers outlined on this slide. And I want to thank you for listening today. And I'm going to turn it back over to Mr. Wolfe for questions.

Skip Wolfe: Thanks JoEllen. We will now move to the question and answer segment of the program. If you have a question that you'd like to ask press star 1 on your phone and our operator will put you into the queue.

And be sure that your question is related to today's topic varicella and zoster. While we're waiting for your questions we'll go through a couple items. First of all, a recast of this program will be available on the internet beginning the week of October 19, 2015.

You'll be able to find that on our website at CDC.gov/vaccines/ed/ciinc. And this will include not only the slides but also the audio and other resource information. Continuing education. For continuing education credit you will have to go to our website at www2a.cdc.gov/TCEOnline, and look for the course number for today's program, which is E as in Edward, C as in cat, 2064-101415, the last part of which you will notice is today's date. This course number is specific to today's course.

You will need that course number when completing CE requirements. You will also need the verification code for today's course which is VARI15. This verification code also applies only to today's course.

Let me repeat that. It's the letters VAR and I followed by the number 15, with no space in-between. CE credit for this program will expire on November 16, 2015.

I'll go over this information again at the end of the question and answer period. But for now let me turn you over to the operator and we will begin taking your questions.

Coordinator: Thank you.

(Amy Huff): Hi the question that I have today is we have a few employees who are varicella negative or equivocal. But a few of them have reported that they have ZOSTAVAX. So my question is do we give them VARICELLAVAX? And if so do we give them one or two doses?

JoEllen Wolicki: Hi Thank you for that question. So what you're telling me is that they have a questionable titer but they've already been vaccinated with zoster vaccine.

(Amy Huff): Correct.

JoEllen Wolicki: Okay. So when we're talking about varicella proof of immunity for and I'm assuming this is healthcare employee. .

(Amy Huff): Yes. An employee health in a hospital setting.

JoEllen Wolicki: Okay. According to CDC acceptable evidence of varicella immunity in a healthcare personal is .

The documentation of two doses of varicella vaccine given at least 28 days apart, the history of varicella or herpes zoster disease based on physician diagnosis, laboratory evidence of immunity, or laboratory confirmation of disease. .

Because you said that they've already received zoster vaccine. So if a healthcare employee has already received a dose of zoster vaccine but has no evidence of immunity to varicella, what we're going to do is we're going to consider that dose that they had of zoster to be their first dose of varicella vaccine - in the varicella vaccine series.

(Amy Huff): Absolutely.

JoEllen Wolicki: Because remember I said earlier that zoster contained actually more antigen than the varicella vaccine. So I do want to take just a little bit of time to talk to you about one caveat. –Verbal report of the vaccine is not what we would consider appropriate documentation.

So if they received a vaccine from their private physician, just because they come to you and they say to you that oh yes and by the way I had zoster vaccine two years ago.
You have to ask them at that point to bring back proof that you received this vaccine. So they need to bring back, , adequate documentation that they received the vaccine - a dose date and, , like the name of the provider that gave it to them.

You just can't take a verbal report. Which, you know, happens a lot.

Once you have adequate documentation of that first dose of zoster vaccine then you're - as long as it's been four weeks, you're going to give them their second dose in the series. And then they're done.

(Amy Huff): Okay. Very good.

JoEllen Wolicki: Does that make sense? Did I lose you at all?

(Amy Huff): No not at all. That's very clear. May I ask one more question regarding equivocal, titer results? If someone falls in the category of equivocal, should we go ahead and vaccinate with two doses of varicella?

JoEllen Wolicki: Yes.

(Amy Huff): Okay.

JoEllen Wolicki: Yes.

(Amy Huff): Thank you.

JoEllen Wolicki: Because we just don't - we're not sure that they're protected. And you're talking about somebody who we need a higher level of presumptive immunity because of what they do. These people have an increased risk of being exposed to disease.

(Amy Huff): Thank you.

Coordinator: Our next question

(Heather): Hi my question is the FDA has approved the ZOSTAVAX and studies show better efficacy. And we know they have a better immune system between 50 and 59. Why doesn't ACIP not recommend giving ZOSTAVAX between 50 and 59? I might have missed that somewhere.

JoEllen Wolicki: That is probably one of my most frequently asked questions is why don't we have routine recommendations between 50 and 59 years of age for zoster.

And there's a couple of reasons. In the past we've had some fluctuations in the vaccine supply. And ACIP recognizes that that age group of 50 to 59 is not the age group that has the highest incidence or the severity of disease.

So they wanted to make sure that the population that is the most vulnerable had it's - had the vaccine was for that population. That's one reason. The other reason is that we're not sure about the duration of immunity.

And we don't have - and there's no data yet on subsequent doses of zoster. So that's why we're looking at this. This is something that they continue to monitor. But right now there's no recommendations for that 50 to 59 age group from ACIP.

(Heather): Thank you.

Coordinator: Next question

(Rosa Ramos): Hello.

JoEllen Wolicki: Hi

(Rosa Ramos): Hi. I had a couple of questions. I do work in healthcare. And one of my questions is can a pregnant women receive the VARAVAX vaccine?

JoEllen Wolicki: No (Rosa). VARAVAX vaccine is contraindicated during pregnancy as as are other live attenuated vaccines. If you have a pregnant woman and they are susceptible then what we recommend is they be vaccinated after the pregnancy is over.

(Rosa Ramos): Okay.

JoEllen Wolicki: Especially for healthcare worker. Because again, you know, these are people that are very - they're at an increased risk of being exposed to the disease than just the general population because they work with sick people. And when people are sick they come...

(Rosa Ramos): Right.

JoEllen Wolicki: ...see them. Yes.

(Rosa Ramos): Yes ma'am. So as healthcare workers should we abort working in close proximity with those patients who are susceptible or at high risk patients after they get vaccinated. And if so, how long should we wait?

JoEllen Wolicki: So (Rosa) I'm going to make sure that I understand your question So if somebody is vaccinated with varicella vaccine, you're asking me if they need to be isolated from patients or kept away from patients? Or had their duties changed?

All right there is no recommendation for that. So there's no - so on a vaccinated healthcare worker can do their normal duties.

(Rosa Ramos): Very good. Okay because that's been our practice apparently for some time. And I just wanted to verify that. So...

JoEllen Wolicki: You know, if you and (Rosa) if you need some documentation for that, if you send that question to nipinfo@cdc.gov we can send you documentation for that if you need that for - to give to somebody in upper management or somewhere - some - a committee or something.

(Rosa Ramos): And that was nipinfo@.?

JoEllen Wolicki: nipinfo so N-I-P-I-N-F-O@cdc.G-O-V.

(Rosa Ramos): Perfect. Thank you so very much.

JoEllen Wolicki: Thank you.

(Skip Wolfe): And that's all our time for questions today I'm afraid. If you have a question that you didn't get answered, I'll tell you how to get that to us in a minute. In the meantime let me go over again the continuing education information I gave you a few minutes ago.

And by the way, thank you JoEllen for your presentation and for answering the questions.

For CE credit, go to our website at www2a@cdc.gov/TCEOnline/, and look for the course number: E as in Edward, C as in Cat, 2064-101415, today's date.

You'll also need the verification code for today which is V-A-R-I15. Again V-A-R-I-1-5.

CE credit for this course will expire on November 16, 2015. If you need help with the online CE system you can call 1-800-41-train. That's 1-800-4-1-8-7-2-4-6, and that's between 8 o'clock am and 4 o'clock pm eastern time. Or you can email CE@cdc.gov. If you had a question today that wasn't answered you can email us at nipinfo@cdc.g-o-v, the same address JoEllen gave a minute ago.

Again that's N-I-P-I-N-F-O@cdc.G-O-V. We will respond as quickly as we can. Or if you would prefer to telephone with your question you can call this number, 1-800-CDC-INFO.

That's 1-800-2-3-2-4-6-3-6, any time from 8 o'clock am to 8 o'clock pm on Monday through Friday.

And for additional resources, first of all there is Epidemiology and Prevention of Vaccine Preventable Diseases, also known as the Pink Book. This is the source for all of these presentations. The 13th edition was published earlier this year.

It can be found online at www.cdc.gov/vaccines/pubs/pinkbook/index.html. You can also purchase the Pink Book from the Public Health Foundation from that same URL.

CDC's vaccine and immunization homepage can be found at www.cdc.gov/vaccines/default.htm. And for description of, and access to, additional CDC immunization resources go to this website

www.cdc.gov/vaccines/ed/downloads/I-M-Z-resources.pdf. Or follow us on twitter for immunization news, information, and resources @cdcizlearn.

And that concludes our presentation for today. Again I'd like to thank Ms. JoEllen Wolicki for her presentation and for answering your questions. And thank you for joining us. Good day from Atlanta.

Coordinator: This concludes today's conference. Thank you for your participation. You may now disconnect.

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